AMENDMENTS TO THE SPECIFICATION

Please amend paragraph [0017] beginning on page 6, as follows:

[0017] Figure 2 depicts a circuit board assembly 30 in which a power chip 12 is mounted to a surface of a low-temperature co-fired ceramic (LTCC) substrate 10 in accordance with the present invention. As an LTCC, the substrate 10 is a monolithic structure made up of multiple ceramic layers 36 and 38 bonded to each other, with thick-film conductors 22 located within the substrate 10 as a result of being formed on individual green tapes that, after stacking and firing at a temperature of up to about 900°C, form the ceramic layers ~~32~~ 36 and 38. Also consistent with LTCC substrates of the past, conductors 22 on adjacent layers 36 are electrically interconnected with conductive interconnect vias 16. The vias 16 are preferably filled through-holes, in which holes having a diameter of about 3 to about 20 mils (about 75 to about 500 micrometers) are formed and filled with a suitable conductive material prior to stacking and firing the green tapes, as will be discussed in greater detail below with reference to Figure 4.

Please amend paragraph [0019] beginning on page 7, as follows:

[0019] According to the embodiment of Figure 2, heat is not conducted through the substrate 10 with thermal vias that extend through the thickness of the substrate 10. Instead, the conduction of heat through the substrate 10 is promoted by the formulation of, in the embodiment shown, the lower ceramic layers 38 of the substrate 10. More particularly, the ceramic layers 38 are formulated to have a thermally-conductive additive that is preferably not present in the upper ceramic layers 36. In the embodiment shown, the lower ceramic layers 38 are bonded surface-to-surface to define a continuous region 34 of the substrate 10 with higher thermal conductivity than the remainder of the

substrate 10, which is also a continuous region 32 as a result of being defined by the ceramic layers 36 bonded surface-to-surface. Alternatively, it is foreseeable that some of the ceramic layers 36 could be located between some of the ceramic layers ~~36~~ 38. In any event, heat generated by the chip 12 is conducted through one or more of the ceramic layers 36 forming the upper surface of the substrate 10, with conduction through the remainder of the substrate 10 and into the heat sink 20 being promoted by the presence of the ceramic layers 38 containing the thermally-conductive additive.

Please amend paragraph [0020] beginning on page 8, as follows:

[0020] As with prior art LTCC substrates, each of the ceramic layers 36 and 38 preferably ~~contains~~ contain a mixture of electrically-nonconductive materials, typically glass and ceramic particles that, when fired, fuse to form a rigid monolithic structure. The thermally-conductive additive contained by the ceramic layers 38 are preferably particles having a higher coefficient of thermal conductivity than the electrically-nonconductive materials of the ceramic layers 36 and 38, resulting in the ceramic layers 38 being more thermally conductive than the ceramic layers 36. Suitable fired compositions for the ceramic layers 36 include, by weight, about 30% to about 100% of a glass frit material such as BaO-CaO-SiO_2-Al_2O_3-TiO_2, with the balance being essentially a ceramic material such as Al_2O_3. In contrast, suitable fired compositions for the ceramic layers 38 include, by weight, about 10% to about 95% thermally-conductive particles, with the balance being a glass frit material such as PbO-MnO-VO_2-CuO-SiO_2-B_2O_3, and optionally up to about 85% of a ceramic material such as mullite ($3Al_2O_3 \bullet 2SiO_2$). Suitable materials for the thermally-conductive particles include metals such as Ag, Cu, Pt, Pd, Ni, W, Mo, Au, and combinations thereof, and non-metallic materials such as aluminum nitride AlN, SiN, BN, SiC, BeO, Al_2O_3 and other high performance ceramic carbides, nitrides and borides. The thermally-conductive particles preferably result in the

ceramic layers 38 having thermal conductivities of at least 10 W/mK. For example, in one formulation the ceramic layers 38 contain about 58 weight percent silver particles having an particle size of about 0.1 to about 10 micrometers, and about 42 weight percent of a glass frit mixture such as BaO-CaO-SiO_2-Al_2O_3-TiO_2. Ceramic layers 38 with this composition have thermal conductivities of about 244 W/mK, as compared to about 3 W/mK for conventional LTCC substrate materials. Furthermore, such ceramic layers 38 have coefficients of thermal expansion (CTE) of about 11 ppm/°C, as compared to about 7 ppm/°C typical for LTCC substrates of the prior art. As such, the ceramic layers 38 have a CTE of within about 4 ppm/°C (roughly about 50%) of the ceramic layers 36. This is a much superior CTE match with LTCC layers than afforded by layers of 100% metal such as Cu, which has a CTE of about 17 ppm/°C.